

# HPV Vaccine and College-Age Men: A Scoping Review

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## Abstract

The human papillomavirus (HPV) potentially affects every sexually active man in the United States and Canada. In 2017, the vaccine became publicly funded in Canada for males ages 9–26, and was integrated into school vaccination programs. In 2019, HPV vaccination was recommended as routine for all U.S.-based males and females ages 9 through 26, and a shared decision for adults >26 years; however, since the approval of the vaccine in 2006 for females only, the age and dosing recommendations for males have followed a complicated and changing trajectory. Current adherence rates are low among college and university age males (18–26 years); therefore, understanding and addressing the barriers and facilitators for men's HPV vaccination is critically important. The purpose of the current scoping review is to provide a synthesis of recent literature pertaining to HPV in college and university age men, as a means to guiding health-care providers (HCPs). Drawing from 15 published articles, three thematic findings were inductively derived. Theme one, *lack of awareness*, was underpinned by men's knowledge deficits about their eligibility for, and the availability of HPV vaccines. Theme two, *underestimating and embodying risk*, included men's engagement in sexual activities while misinformed or denying the risk for contracting HPV. The third theme, *strategies for increasing men's awareness*, summarizes messaging strategies used to lobby young men to vaccinate. The review findings indicate gender-sensitive interventions targeting college-age men, including early, frequent, and consistent messaging on HPV are key.

## Keywords

College men, special populations, sexual health, sexuality, public health, health-care issues

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More than 70% of sexually active individuals will contract human papillomavirus (HPV) at some point in their life (Canadian Public Health Agency, 2014). Other estimates of the lifetime probability of acquiring HPV are higher than 80% (Chesson et al., 2014). The first vaccine for HPV was introduced in the United States and Canada in 2006; at that time, it was recommended for females only, ages 9–26. In 2010, Health Canada expanded the recommendation for population-wide vaccination to include males of the same age range, although this strategy was not publicly funded until 2017. In the United States, 2010 permissive recommendations similarly extended HPV vaccination to males ages 9–26; in 2011, the vaccine received a routine recommendation for males ages 13–21, and a permissive recommendation for males 22–26 years. In 2019, routine recommendations changed to include males (and females) 11–26 years and shared

decision-making for adults above 26 years. The history of the guidelines is complex and consistently denied males equal access to the health benefits of the vaccine, reflecting a schism between science, policy, and economics (Daley et al., 2017). In Canada, universal health-care and school programs cover the costs of the vaccine. In the United States, due to a lack of basic health-care coverage

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for all citizens, shifting vaccine recommendations resulted in additional complicated insurance issues; although public programs such as the federal Vaccines for Children exist, debates over school vaccine programs continue at the state level amid a patchwork of private and public coverage (Centers for Disease Control [CDC], 2019a; Kaiser Family Foundation, 2018; National Conference on State Legislatures (NCSL), 2020).

Since the introduction of the vaccine for men, adherence has been staggeringly low (Bird et al., 2017). According to a 2017 systematic review, male HPV vaccine adherence was only 47%, well below the >85% target set by the Canadian government (Bird et al., 2017). Similarly, in the United States, approximately 44% of teenage boys (aged 13–17) had the vaccine (Kaiser Family Foundation, 2018), while among male college students, 53% indicated they had received the vaccine (American College Health Association, 2019). Other research suggests that men's HPV vaccine completion rates (comprising a series of three HPV vaccines over 6 months at that time) were only 14% (Johnson et al., 2017).

HPV can cause benign and malignant anogenital disease as well as head and neck lesions (Palefsky et al., 2011). Most HPV infections in males (and females) are asymptomatic, but often present as genital warts. The two HPV strains most attributable to anogenital warts are HPV types 6 and 11 (>90%) and 20%–50% of cases involve a combined infection with oncogenic HPV types (Palefsky et al., 2011). HPV types 16 and 18 are most commonly associated with cancers of the penis, anus, and oropharynx (Palefsky et al., 2011); oropharyngeal cancers comprise approximately 80% of HPV-associated cancers in men each year (CDC, 2019b). HPV is also believed to cause 90% of anal cancers, 60% of penile cancers, and is linked to 70% of oropharynx cancers (CDC, 2019c). Since the infections are typically asymptomatic until life-changing progression occurs, vaccination is an especially important protection and ideally prevention strategy. To advance cancer prevention, it is essential that HPV vaccination be adapted by men and women.

### *HPV and the Impact of Vaccination for College- and University-Age Males*

Upwards of 44,000 HPV-associated cancers occur in the United States each year; 19,000 are diagnosed in men, most commonly oropharyngeal cancer (CDC, 2019a, b, c). In 2020, there remains no Food and Drug Administration (FDA)-approved test available to detect the virus's DNA in males. Males are unlikely to know if they are infected with HPV, unless they have been diagnosed with anogenital warts, HPV-associated intraepithelial neoplasia, or HPV-related carcinoma (Workowski

& Bolan, 2015). Males have a high potential for developing serious life-changing disease as well as unknowingly passing the virus on to their partners. Modeling predicting impacts of the vaccination on HPV type 16 infections and cervical cancer predicted that vaccination of 80% of 12-year-old girls would reduce HPV type 16 prevalence by 60%–100% in vaccinated, and 7%–31% in unvaccinated females; whereas, if 80% boys were also vaccinated, reductions would be 74%–100% in vaccinated and 86%–96% in unvaccinated females (Regan et al., 2007). A population study of HPV-associated cancers concluded that the HPV16/18 vaccine could prevent 60% of oropharyngeal cancers (Saraiya et al., 2015), which are most common in males. In June 2020, the FDA approved Gardasil 9 for the prevention of oropharyngeal cancer in males and females, ages 9–45; however, additional clinical trials required to demonstrate benefit are needed (F.D.A., 2020). With such potential reductions, the public health benefits of increasing HPV vaccine adherence among males are evident, and by extension, the avenues for achieving widespread uptake of the vaccine are critically important.

In the unique context of HPV vaccines, it is fair to say that men have been a latent target of messages to encourage vaccination (Pérez et al., 2015). To some extent, the afterthought of targeting men has revealed gender-blind public health practices that perhaps inadvertently led to lobbying women to take responsibility for HPV vaccination—and by extension prevention of HPV. Because the HPV vaccine was initially approved and introduced for females only, there may be lingering confusion among the public and health-care providers (HCPs) about its value for males. In tandem, the absence of tailored messaging for men has played to stereotypes that men do not engage self-health, a dominant discourse that can also mislead HCPs about the need to expect yields from actively promoting HPV vaccination in young men (Salgado et al., 2019).

### *Purpose for Current Scoping Review*

With HPV vaccination adherence rates unacceptably low among college- and university-age males (18–26 years), the purpose of this scoping review was to provide a synthesis of recent relevant literature on young males and HPV vaccine as a means to guiding HCPs. Because the vaccination for males was not approved by the FDA and recommended by the National Advisory Committee on Immunizations (NACI) until 2012, and the guidelines for males did not extend through to age 26 until 2019 (Howard, 2019), the literature regarding how best to support and implement vaccine uptake within this population, is at best, emergent (Ratanasiripong, 2015; Salvadori, 2018). The vaccine is offered to males and females

starting in grade six (ages 11–12) in the United States and Canada as part of routine vaccine schedule; however, there is no regularly scheduled follow-up once they finish high school and begin post-secondary education. In addition, there are inconsistencies across the U.S. states in regard to school vaccine policies (National Conference on State Legislatures (NCSL), 2020). After age 18, many young men navigate their health independent of family, making decisions on their own. Their estrangement from health-care services has been well documented, especially in the context of sexual health and sexually transmitted infection (STI) screening (Salgado et al., 2019). Therefore, an important first step in creating an effective intervention to increase HPV adherence is the exploration of college- and university-age men's practices, beliefs, and decision-making processes regarding vaccinations and health prevention. Understanding males' (18–26 years) perceptions of HPV risk and screening is critical to tailor clinical guidelines and raise awareness among men and HCPs about the benefits of HPV vaccination (Fontenot et al., 2014).

## Methods

Scoping reviews are useful for producing knowledge syntheses about poorly understood health issues (Colquhoun et al., 2014; Peterson et al., 2017). Differentiating from systematic reviews and meta-analyses, the current scoping review includes diverse literature to point to emergent empirical insights, knowledge gaps, and potential next steps to advance male HPV vaccinations (Arksey & O'Malley, 2005). In line with scoping review methods, the literature was not formally evaluated or weighted in terms of individual studies. Rather, empirical studies were reviewed as a means to understand and contribute recommendations for future research, education, practice, and policy (Peterson et al., 2017). Guided by Arksey & O'Malley (2005), five key stages were followed in the current scope: (1) identifying the research question, (2) identifying relevant studies, (3) relevant study selection, (4) charting the data, and (5) collating, summarizing, and reporting the results.

Guided by the research question “What are the facilitators and barriers to HPV vaccination adherence among undergraduate U.S. and Canadian based college and university age males (18–26 years)?” Google Scholar, MEDLINE, and CINAHL databases were searched using the following keywords: papillomavirus vaccine, human papillomavirus vaccine, HPV vaccine, college student(s), university student(s), undergrad, men, male(s), young adult(s), and student(s), male HPV related cancer. The search terms were applied in a variety of combinations using Boolean operators and MeSH subject headings. Inclusion criteria included qualitative and quantitative

research articles published between 2015 and 2019 inclusive, written in English, and focused on male populations or samples between the ages of 18 and 26 years.

In total, the searches returned 675 articles. Titles and abstracts of each article were read and appraised for their relevance to the topic and research question. Articles reporting female or female and male aggregate results, with their sample residing outside the United States and Canada, and the age range of 18–26 years old were excluded from the search results. Duplicate articles were also removed, resulting in 15 articles that met the inclusion criteria.

Each of the 15 articles were analyzed by first reading the article in full. To assist in organizing and classifying principal aspects of each article, a matrix table was developed by extracting the following elements: year of publication, country of origin, study purpose, design/methodology, population and sample size, and important findings. The matrix provided a scaffold from which to inductively derive the prevailing themes along with key concepts identified across the studies (Table 1).

In categorizing the main findings of each study, three key themes were identified and further analyses and delineation of each were developed in the writing up of the results. Theme one, *lack of awareness*, was underpinned by men's knowledge deficits about their eligibility for, and the availability of HPV vaccines. Theme two, *underestimating and embodying risk*, included men's engagement in sexual activities while uninformed or denying the risk for contracting HPV. The third theme, *strategies for increasing men's awareness*, summarizes health messaging strategies used to lobby young men to vaccinate.

## Results

The 15 North American-based studies included in the current scoping review consisted of the following methodologies: seven (46%) quantitative, four (27%) qualitative, and four (27%) mixed-methods. Thirteen (86%) studies were conducted in the United States and two (13%) in Canada.

### *Lack of Awareness About HPV*

Lack of awareness regarding HPV and the HPV vaccine was a consistent theme in over half the studies ( $n = 9$ ; 60%). When asked about HPV and the vaccine, the results consistently revealed significant knowledge deficits wherein many men did not know the disease or vaccine existed (Catalano et al., 2017; Fontenot et al., 2014; Fuller & Hinyard, 2017; Grace-Leitch & Shneyderman, 2016; Hunter & Weinstein, 2016; Pitts et al., 2017; Priest et al., 2015; Ratanasiripong, 2015; Tatar et al., 2017).

Table I. Matrix.

Authors/Year/ Country	Purpose	Design/ Methodology	Population and Sample Size	Findings
1) Bonafide & Venable, 2015 USA	To clarify the influence of information designed to enhance altruistic motives for HPV vaccination beyond the effects of a brief intervention that only emphasized self-protection on male HPV vaccine acceptance	Quantitative study that used a computer-administered survey to view informational interventions that varied in the inclusion or exclusion of altruistic motives and in the level of emphasis on male-specific HPV-related illnesses and vaccine benefits. HPV vaccine acceptance was assessed immediately after intervention.	Male undergrad students enrolled in an introductory psychology course at a large Northeastern university N = 200	Participants who received the intervention emphasizing both altruistic motives and male-specific information endorsed the greatest vaccine acceptance. Provider- and community-level interventions highlighting both altruistic motives and personal health vaccine benefits may enhance HPV vaccine uptake among young men.
2) Catalano et al., 2017 USA	To test theory of planned behavior (TPB) constructs in predicting HPV vaccination behavioral intentions of vaccine-eligible college men.	Qualitative non-experimental cross-sectional study design collected from an online self-report questionnaire	College men ages 18–26 N = 256	Attitudes toward the behavior and subjective norm were significant predictors of behavioral intention, accounting for 58% of its variance. Practitioners may utilize this instrument for the development and evaluation of TPB-based interventions to increase HPV vaccination intentions of undergrad college men.
3) Darville et al., 2018 USA	To evaluate the effectiveness of a digital gaming intervention aimed at increasing HPV risk perceptions, self-efficacy, and behavioral intention to receive the HPV vaccine among college-age men (18–26).	Quantitative randomized control trial	College men 18–26 N = 108	Customizing an avatar to look like one's ideal or actual self increased the perception of HPV risk and self-efficacy to obtain the vaccine. Digital gaming modalities show promise for health behavior change among this population.
4) Fernandez et al., 2016 USA	The study describes the development and validation of TTM-based measures of stage of change, decisional balance, and self-efficacy for HPV vaccination that are tailored to men ages 18–26 years old.	Mixed-methods study using a cross-sectional measurement using online surveys. Sequential approach to measurement for qualitative item development, focus groups, cognitive interviews, survey administration, and quantitative analysis.	Mostly college-age men ages 18–26 N = 329	This study resulted in reliable and valid measures of pros and self-efficacy for HPV vaccination that can be used in future clinical research.
5) Fontenot et al., 2014 USA	To examine HPV vaccination rates, including initiation and completion of the vaccine series, and barriers to vaccination in a sample of male college students approximately 3 years post vaccine availability.	Mixed methods, cross-sectional study. Web-based survey at a large public university	Male college students 18–25 N = 735	Condom use was low, and number of lifetime sexual partners was high; 93% reported they were not at risk for STI. The college men sample had low HPV vaccine awareness, knowledge, perceived severity, and perceived susceptibility, and 74% of the sample had not obtained the HPV vaccine. There is a disconnect between actual and perceived risks of HPV and barriers to HPV vaccination.
6) Fuller & Hinyard, 2017 USA	To describe and compare characteristics of men who did and did not report receiving at least one dose of the HPV vaccine. To determine the percentage of young in the Behavioral Risk Factor Surveillance System (BRFSS) database who self-reported receiving the HPV vaccination and what factors were predictive of immunization	Quantitative cross-sectional analysis of data from the ten states that completed the HPV vaccination module in the 2013 BRFSS.	Males ages 18–26 N = 1624	Only 16.5% of men reported at least one dose of HPV vaccine. Having health insurance, having a primary doctor, and receiving an HIV test were predictive of HPV vaccination. Men in Texas were more likely to report HPV vaccination than all other states. Overall, HPV vaccination is low in men. Targeted interventions for improving HPV vaccination rates in men are warranted, especially for those without health insurance or a routine source of care.
7) Grace-Leitch & Shneyderman, 2016 USA	To examine the link between HPV knowledge and self-efficacy for preventive behaviors among college students as well as HPV vaccine acceptability.	Quantitative study. Cross-sectional survey of students at a 2-year college in New York City was conducted electronically.	Male students N = 120	HPV knowledge was low among this sample, but self-efficacy and vaccine acceptability were high. Self-efficacy and perceived susceptibility to HPV predicted vaccine acceptability, but not condom use. The challenge for health-care practitioners and health educators is to provide focused, comprehensive education about HPV without causing undue fear.
8) Hunter & Weinstein, 2016 USA	The objective of this study was to assess male undergraduate students' HPV knowledge and intentions to receive the HPV vaccination.	Qualitative study. Cross-sectional survey. Convenience sample.	Male undergraduate students from a mid-west university in the United States ages 18–26 N = 116	Awareness and levels of knowledge about HPV and HPV vaccine were low among male undergraduate students, as well as intentions to receive the HPV vaccine. Future work should encourage the developmental and implementation of campus-wide health education programs that discuss the HPV vaccine and benefits for men.

(continued)

**Table 1. (continued)**

Authors/Year/ Country	Purpose	Design/ Methodology	Population and Sample Size	Findings
9) Jones et al., 2016 Canada	To identify sociodemographic and psychosocial predictors of HPV-related stigma and, using the precaution adoption process model (PAPM), to examine the relationship between HPV-related stigma and HPV vaccine decision-making among college males.	Quantitative PAPM to evaluate HPV vaccine decision-making. Self-report survey assessing HPV-related stigma, psychosocial predictors of HPV-related stigma, and HPV vaccine decision-making.	College-age males from three Canadian universities (McGill, University of Toronto, and University of Ottawa) Ages 18–26 N = 680	Ethnicity, province of residence, and perceived severity of HPV were reported to significantly influence HPV-related stigma. HPV-related stigma was higher in those unaware of the availability of the HPV vaccine for males. Efforts should concentrate on Asian minorities and should avoid severe HPV messaging, as this may lead to increased stigma, which may act as a barrier to vaccination.
10) Lee et al., 2018 USA	To investigate the levels of HPV vaccination and predictors of HPV vaccine completion in college men ages 18–26.	Quantitative study. Data analyzed from the 2015 College Student Health Survey, which was administered at 17 post-secondary institutions in Midwest areas. Andersen's Behavioral Model of Health Services Utilization guided study design.	Male students ages 18–26 N = 2,516	Efforts are needed to increase HPV vaccination in male students who are older, from lower socioeconomic statuses, have not initiated sex, and enrolled at public institutions. Findings also indicate important gender disparities in vaccine uptake that must be addressed in order to achieve optimal vaccine uptake in college-aged males.
11) Pask & Rawlins, 2016 USA	Examined men's perceptions of risk and efficacy beliefs as predictors of their intentions to engage in self-protective behaviors	Mixed methods utilizing the risk perception attitude framework (RPA)	Men ages 18–26 N = 157	Results provide support for the main effects of risk and efficacy on all four behavioral intentions examined (i.e., Internet information-seeking, communication with a health provider, HPV vaccination, and condom use). Risk and efficacy were positively related to (and significant individual predictors of) all four behavioral intentions.
12) Pitts et al., 2017 USA	Purpose of this study to uncover enduring and novel HPV health beliefs held by college males in order to target them more effectively in HPV prevention messages.	Qualitative Focus group discussions conducted using the health belief model	College males ages 18–26 N = 84	Identified health beliefs act as barriers to HPV prevention (e.g., lack of knowledge/awareness, apathy, dismissiveness, stigma, practical barriers, and skepticism). Prevention and protection are perceived benefits to HPV prevention.
13) Priest et al., 2015 USA	To use social cognitive theory to predict HPV vaccination intentions of college men attending a large, south-eastern university.	Qualitative nonexperimental, cross-sectional design. Used a 39-item instrument with measures of the six selected SCT constructs as well as descriptive and demographic items.	Undergraduate men (ages 18–26) who had not received the HPV vaccine. N = 309	Also identified college male health beliefs. One barrier was the perception that it was "too late" for college males to benefit from the vaccine. Situational perception and self-control to get HPV vaccine were significant predictors, accounting for 22% of variance in behavioral intentions to get vaccinated within the next 6 months. College men reported low behavioral intentions to getting vaccinated. Future interventions should target situational perception and self-control to increase HPV vaccination intentions.
14) Tatar et al., 2017 Canada	To evaluate the psychosocial correlates of HPV acceptability in college males based on multiple stages of HPV decision-making.	Mixed methods Online questionnaire to collect data from college men aged 18–26 enrolled at three Canadian universities between September 2013 and April 2014.	Male students ages 18–26 N = 428	Most male college students were unaware that the HPV vaccine could be given to males, unengaged, or undecided about getting the HPV vaccine. Significant correlates of higher HPV vaccine acceptability were increased HPV knowledge, having discussed the HPV vaccine with a health-care provider, and social norms. Being in an exclusive sexual relationship was significantly associated with lower HPV vaccine acceptability. Students' actual HPV and HPV vaccine knowledge was low and positively correlated to their perception about their HPV knowledge.
15) Ratanasiripong, 2015 USA	To examine the vaccination rate and identify factors influencing HPV vaccination among college men	Quantitative cross-sectional study, guided by TPB	Convenience sample of college males (18–26 years) N = 410	Intentions to increase the vaccination rate should focus on creating positive attitudes toward getting vaccinated against HPV through behavioral beliefs. Increasing the subjective norm will be beneficial.

Note. HPV = human papillomavirus; STI = sexually transmitted infection; SCT = social cognitive theory.

This lack of awareness and knowledge was the most commonly reported contributing factor for low vaccine rates and high levels of HPV-related illness (Catalano et al., 2017; Fontenot et al., 2014; Hunter & Weinstein, 2016; Jones et al., 2016; Pitts et al., 2017; Priest et al., 2015; Ratanasiripong, 2015; Tatar et al., 2017). For example, Hunter and Weinstein (2016) noted that of those men surveyed, 35% ( $n = 40$ ) indicated that they had never heard of HPV and 51% ( $n = 59$ ) indicated they were unaware of the HPV vaccine before taking the survey. Among participants, 80% ( $n = 93$ ) also indicated that they did not know the HPV vaccine was available for men (Hunter & Weinstein, 2016). Similarly, another study reported that 31.3% ( $n = 80$ ) of the sample had never heard of HPV, and 45.3% ( $n = 116$ ) were unaware of the vaccine, even though 86.3% ( $n = 221$ ) reported having previously engaged in oral, vaginal, and/or anal sex (Catalano et al., 2017). Vaccine-related decision-making was correlated to awareness and knowledge levels about the HPV infection and negative health outcomes, as well as the existence of the vaccine and its availability for men (Pitts et al., 2017; Priest et al., 2015; Tatar et al., 2017).

Several studies indicated that although some participants had heard about HPV and the vaccine, when asked specific questions regarding the disease and prevention, significant knowledge deficits were evident (Pitts et al., 2017; Priest et al., 2015). Similar results were reported in a Canadian study wherein only 21.5% ( $n = 92$ ) of respondents indicated being aware that most sexually active people get HPV at some point in their lives; 29.9% ( $n = 128$ ) knew that the HPV vaccine offered protection against genital warts, and 32.7% ( $n = 140$ ) were knowledgeable about the number of doses required to achieve adequate protection (Tatar et al., 2017). These statistically significant results indicated only one-fifth of the participants (19.46%,  $n = 83$ ) accurately categorized themselves as having sufficient HPV knowledge (Tatar et al., 2017).

Because HPV knowledge and awareness are so limited in males, their understanding of the consequences of contracting HPV is also low (Fontenot et al., 2014). In one study, only 56% of participants ( $n = 123$ ) were able to correctly identify issues related to HPV, indicating that nearly half were unaware of the symptoms (or lack of symptoms), consequences, and/or risks associated with an HPV infection (Grace-Leitch & Shneyderman, 2016). Several studies reported that little to no understanding about HPV could lead to negative health complications for men, an outcome directly associated with lack of STI knowledge (Fontenot et al., 2014; Hunter & Weinstein, 2016; Priest et al., 2015; Tatar et al., 2017). In other research that surveyed participants on their HPV knowledge, only 45% ( $n = 139$ ) were aware that HPV can cause cancer, and only 62% ( $n = 192$ ) of participants were

aware that HPV could cause genital warts (Priest et al., 2015). Similar findings were reported by Ratanasiripong (2015); less than or approximately half the participants ( $n = 189$ ) knew that HPV can cause anal cancer, and/or genital warts, and be transmitted via skin-to-skin contact. Widespread misperceptions of HPV including minimizing the severity and/or susceptibility in males have led to a largely dismissive attitude to vaccination (Fontenot et al., 2014).

### *Underestimating and Embodying Risk*

Present in over half the articles ( $n = 9$ ; 60%), underestimating risk was characterized by men's lack of perceived risk and susceptibility for contracting HPV. A common misconception among college and university age men was the belief they were not at risk for contracting HPV. Many believed HPV affected females only (Fontenot et al., 2014; Tatar et al., 2017). For example, the Tatar (2017) study reported that 74.8% ( $n = 320$ ) of respondents believed men could not contract HPV (Tatar et al., 2017). Condom use, knowing their partners' sexual history, and/or believing they had already been exposed to HPV in the past were offered as risk-reducing and -protective factors by men (Fontenot et al., 2014). Among Canadian men, 81.3% ( $n = 347$ ) were aware that condom use reduced HPV transmission (Tatar et al., 2017). Similar results were identified in a U.S.-based study where 84% ( $n = 159$ ) participants were aware that condoms provided partial protection against HPV (Ratanasiripong, 2015). The misconceptions that condoms provided full protection against HPV lead to underestimation of risk and lower vaccine rates (Ratanasiripong, 2015; Tatar et al., 2017). Among men with basic knowledge of HPV risk factors (i.e., multiple sexual partners, not using condoms), 93% ( $n = 683$ ) self-reported they were not at risk for contracting an STI, illustrating a disconnect between actual and perceived risk (Fontenot et al., 2014). Apathy about, and dismissiveness toward, HPV and its health implications were a commonly reported finding (Fontenot et al., 2014; Pitts et al., 2017; Ratanasiripong, 2015). One study indicated that 68.9% ( $n = 295$ ) respondents believed that HPV was a very rare disease (Tatar et al., 2017). Male preconceptions of invincibility were also a factor in the lack of preventative practices (Pitts et al., 2017).

Young adult males (18–26 years) expressed the perspective that it was too late to get the vaccination given their active sexual history, and believed they no longer qualified to receive the vaccination, putting them at increased risk (Pitts et al., 2017). Another barrier that men reported was the stigma associated with STIs and the perception that vaccination might be misconstrued as treatment for HPV (Pitts et al., 2017). In other words,

stigma was a more potent influence than health risks for many young men. Risk was also minimized when contraction of HPV was perceived as less serious than other STIs (i.e., HIV; Fontenot et al., 2014; Pitts et al., 2017). The role of media was cited as influencing some men's alignment to risky sexual behaviors and promiscuity in tandem with the dismissal of the importance of HPV vaccine due to the information being presented and the lack of male inclusion (Bonafide & Vanable, 2015; Perez et al., 2015).

### *Strategies for Increasing Men's Awareness*

The pivotal role that HCPs can play in engaging and encouraging HPV vaccine adherence was a common finding in 53% ( $n = 8$ ) studies (Bonafide & Vanable, 2015; Fontenot et al., 2014; Fuller & Hinyard, 2017; Hunter & Weinstein, 2016; Lee et al., 2018; Priest et al., 2015; Ratanasiripong, 2015; Tatar et al., 2017). In this regard, HCPs played an integral role in both creating awareness and education opportunities about HPV, and administration of the HPV immunization. Even a simple conversation with an HCP was reported to increase HPV vaccine adherence in university- and college-age males (Fuller & Hinyard, 2017; Hunter & Weinstein, 2016; Tatar et al., 2017). In one study, 43% ( $n = 24$ ) students who initiated discussion with an HCP received a positive recommendation to vaccinate (Tatar et al., 2017). As male adolescents become adults, however, the opportunity to have these health-promoting conversations diminished because routine health-care visits were low among young men. Healthy young adult males were lost to routine medical care and check-ups, and were therefore unlikely to engage these types of conversations with their HCP (Fontenot et al., 2014).

A major barrier to vaccine uptake reported in several studies was simply that college-age men had never been offered the vaccine by their HCPs (Bonafide & Vanable, 2015; Fontenot et al., 2014; Fuller & Hinyard, 2017; Hunter & Weinstein, 2016). Among the 116 participants in one study, only 6% ( $n = 7$ ) indicated they had received the HPV vaccine, all of whom stated that they were informed about the vaccine by an HCP (Hunter & Weinstein, 2016). Similar findings were reported in another study in which 60.9% ( $n = 989$ ) participants indicated the most common reason for not receiving the vaccine was that their HCP had not recommended it (Fuller & Hinyard, 2017). Likewise, a Canadian study indicated that 81% ( $n = 347$ ) male participants (ages 18–26) had visited an HCP in the past year; however, 87% ( $n = 373$ ) suggested that their HCP had never discussed the HPV vaccine with them (Tatar et al., 2017).

Lack of access to a regular HCP was listed as another direct barrier to receiving education and ongoing

reminders about health preventative practices including the HPV vaccine. In a U.S. study, 51% ( $n = 684$ ) participants unvaccinated against HPV reported that they did not have a primary HCP; whereas 72% ( $n = 203$ ) of the vaccinated participants reported that they did access an HCP (Fuller & Hinyard, 2017). Men with a regular HCP were almost two and half times more likely to have received an HPV vaccine compared to those without an HCP (Fuller & Hinyard, 2017). Most of the males who received the vaccine (75%,  $n = 207$ ) also reported having access to an HCP (Fuller & Hinyard, 2017). With college- and university-age men being the subpopulation most often without an HCP, providers should use every opportunity to enhance and educate young men on appropriate self-care practices (Bonafide & Vanable, 2015). Despite this important strategy in HPV vaccine adherence, studies with HCPs have revealed that HCPs are more likely to recommend the vaccine to female patients than male patients (Lee et al., 2018), contributing to a significant gender bias regarding HPV.

Conversations about preventative health behaviors at an early age fostered normative beliefs about prevention regarding safe sexual health practices. For example, a U.S. study suggested that to enhance positive attitudes toward HPV vaccination, interventions should focus on behavioral beliefs of young males and this could be achieved by frequent and early messaging both from parents and from sexual health education delivered by HCPs (Ratanasiripong, 2015). Having a parent who held a graduate degree was significantly associated with the higher odds of male child HPV vaccine completion (Lee et al., 2018). In two studies, the age of the male was the only significant demographic characteristic associated with HPV vaccination (Fontenot et al., 2014; Ratanasiripong, 2015). On a continuous range from 18 to 25 years, there were 24% lower odds of having obtained the HPV vaccine for every year these young men grew older (Fontenot et al., 2014). These findings indicate the need to increase HPV knowledge among parents and introduce health education at earlier ages, and ideally these prevention practices will carry forward into adulthood.

Several studies concluded that the communication of altruism in conjunction with HPV information could improve vaccination rates among males. When HPV knowledge included the benefits to men's partners and broader health benefits at the global level, vaccine recommendations were more likely to be taken up (Bonafide & Vanable, 2015). In a U.S. study, increased acceptance occurred when participants were given information about the HPV vaccine for males *plus* altruistic motivations compared to participants who received the male-focused HPV information only (Bonafide & Vanable, 2015). Altruistic motivation was identified in another study in which men's recognition of the broader social benefits of

HPV prevention for others was highlighted as a motivating factor to vaccinate (Pitts et al., 2017). A novel strategy was evaluated in a digital gaming randomized control trial (RCT) designed to improve vaccine outcomes among young male college participants; results demonstrated how the use of customized avatars increased men's risk perception, self-efficacy, and behavior intention to receive the vaccine (Darville et al., 2018).

## Discussion

This scoping review was conducted to better understand the facilitators and barriers to HPV vaccination adherence among U.S. and Canadian undergraduate college- and university-age males (18–26 years), and to recommend how HCPs can use this knowledge to guide practice, influence change, and establish improved men's health promotion strategies. The chief areas identified in this review were men's lack of awareness, their underestimation of risk, and the need for male-focused early intervention. However, given the complex history and series of changes in vaccine policy recommendations for males, it is not surprising that the findings confirmed that men's understanding of risk and overall HPV knowledge was limited.

HCPs can focus on these areas to increase HPV vaccination rates among men. Perhaps the most important finding in this review is the influence that HCPs carry related to vaccine adherence. HCPs are well-positioned to educate and advocate for the importance of the HPV vaccine (Bonafide & Vanable, 2015; Fontenot et al., 2014; Fuller & Hinyard, 2017; Hunter & Weinstein, 2016; Lee et al., 2018; Priest et al., 2015; Ratanasiripong, 2015; Tatar et al., 2017). There is consensus beyond this review that vaccine adherence increases with HCP recommendations (Alexander et al., 2015; Allison et al., 2016; Gerend et al., 2016). However, it is challenging to define practice guidelines regarding the specific current findings due to the wide-ranging variables influencing diverse patient populations.

Standardized HPV education and information practices for HCPs are in progress. However, HCPs should concentrate on repeated dissemination of information about HPV and the vaccine at every relevant opportunity. The most important reminder for HCPs when approaching this topic with patients and families is that the spectrum of readiness with adolescent sexual activity varies greatly and information must be provided in a family-centered approach, with appropriate and careful consideration for the specific individuals (Money et al., 2007). Professional organizations continue to reinforce that vaccination against HPV is the best primary prevention method, and that screening for asymptomatic HPV infections is not possible because there is no validated test for

men (Money et al., 2007; Saslow et al., 2016). Guidelines from the American Cancer Association reinforce the notion that opportunities should be presented for young men in college to be vaccinated, and that young adults should not require parental consent to receive the HPV vaccine.

Despite the influential role of HCPs in educating males about the benefits of HPV vaccination, HCPs often forfeit or miss those opportunities during consults (Cummings et al., 2015). Daley et al. (2017) recounted the historical "feminization of HPV" and the complicated guidelines, dosing schedules, and conflicting information from the FDA and Advisory Committee on Immunization Practices (ACIP) for over a decade. That complex history may have contributed to vaccine gender biases among HCPs as well. Complicating the role of the HCPs in vaccine compliance is the fact that increasingly many Americans and Canadians are without a primary HCP. In Canada during 2016, 15.8% of citizens (approximately 4.8 million people) over 12 years of age were without a primary HCP. Significantly more males (19.9%) compared to females (11.9%) were without a primary HCP, and males 18–34 years old were more likely than any other age group to be without a regular HCP (Statistics Canada, 2016). Similar results have been noted in the United States; 28% of men compared to 18% of women over the age of 18 were without a regular HCP. Lack of access and connectedness to HCPs for a significant portion of the population implies that there is an increased likelihood that HPV health messaging cannot be disseminated to college-age males.

Media plays an important role as a source of public information about HPV. Because the HPV vaccine was initially framed as a female responsibility, publicly funded for women only with advertising explicitly targeting females, public health campaigns are playing catch-up to recalibrate messaging to include males. Two significant findings from this review could be incorporated into health promotions messaging and HCP discussions. First, changing attitudes toward HPV vaccination and gender norms can significantly predict intentions to vaccinate (Ratanasiripong, 2015). If education about HPV and sexual health starts at a young age, positive values and practices toward sexual health and STI prevention can result in increased vaccine adherence. Second, findings suggested that stressing both the male-specific health benefits as well as altruistic motives such as protecting others by vaccinating can improve male receptivity to vaccination. Advertising campaigns, public health messaging, school vaccination programs, and HCP consults may achieve greater impact on male vaccine adherence by pairing these ideas (Bonafide & Vanable, 2015). The role of altruism in young men's health has been confirmed in other research. A Canadian

study investigating masculine norms in relation to health care reported that young men (ages 15–29) consider putting the welfare of others ahead of their own to be a deeply valued positive masculine behavior (Oliffe et al., 2019). The use of video gaming to creatively deliver messaging about HPV to young college-age men also plays to normative masculinities and values such as competitiveness, promoting behavior intent to receive the vaccine (Darville et al., 2018).

The most common misconceptions were perceptions that young men believed it was too late to be vaccinated and that HPV only affects women. This misinformation illustrated the lack of understanding about perceived timing, risk, and the severity of HPV-related illness (Hunter & Weinstein, 2016; Pitts et al., 2017; Priest et al., 2015; Ratanasiripong, 2015). The lack of perceived risk (Fontenot et al., 2014; Hunter & Weinstein, 2016; Pask & Rawlins, 2016) was directly related to both lack of awareness and the well-documented absence of sexual health-seeking behaviors typically seen in young males (Salgado et al., 2019). Lack of HPV knowledge combined with high-risk sexual behaviors in late adolescence and early adulthood highlight the need for health promotion strategies to prevent life-changing illnesses (Crocker et al., 2019). Community-based health promotion programs need to be tailored specifically to young men's needs and counter normative beliefs and misperceptions about risk.

In order to enhance positive attitudes toward HPV vaccine adherence, interventions altering behavioral and beliefs (e.g., having anogenital cancer is negative and getting the vaccine protects men from serious illness) can enhance and transform subjective norms (Ratanasiripong, 2015). HCPs can develop educational programs to increase patient education and awareness about HPV; evaluate current health center policies and procedures to assess for known barriers; and support an environment that promotes vaccination (Fontenot et al., 2014). Although educating males on the risks of HPV is vital, the focus of interventions should not be on the severity of HPV; heightened perceptions of HPV severity can lead to higher HPV-related stigma, which in turn may act as a barrier to vaccination (Jones et al., 2016). Stigma is a more influential barrier to vaccine adherence when participants are in early stages of HPV vaccine decision-making, namely “unaware” (Jones et al., 2016). Health promotion campaigns should focus on educational facts of HPV without fueling stigmas or anxieties surrounding HPV. Information presented to college-age men should emphasize that although the vaccine is most effective with the series completed prior to sexual debut, the vaccine continues to be beneficial as a preventative measure even after a person has engaged in sexual activities (Pitts et al., 2017).

Due to extended approval of the vaccine for men, there needs to be a significant shift in how information is presented to college- and university-age men (18–26; Catalano et al., 2017; Fontenot et al., 2014; Hunter & Weinstein, 2016; Pitts et al., 2017; Priest et al., 2015). Masculine values as they pertain to male health care are highly relevant for a disease and treatment that have previously been highly feminized. This pivot in public health policy may explain why the current review reported that significant barriers to vaccination were male perceptions of the HPV vaccination as feminine, and therefore not applicable and perhaps stigmatizing.

Gendered health behaviors are learned and may be socialized in men from an early age, reinforced during adolescence, and amplified in early adulthood (Crocker et al., 2019). Studies have demonstrated that aligning to traditional masculine norms predicts men's low rates of engagement in preventative health behaviors, such as routine medical exams, self-care practices, and psychological help (Salgado et al., 2019). Men who do disclose engaging in sexual health promoting practices risk being characterized as “feminine” or “weak” (Salgado et al., 2019). Often, male-biased stereotypes may alter the HCP's perception of how men receive information, and they may withhold discussions about HPV that otherwise may have been well received. For example, female physicians have been reported to provide patients with more preventive and counseling services than male physicians (Bertakis, 2009). Dominant expressions of traditional masculinity, such as competitiveness, risk-taking, self-reliance, stoicism, and being perceived as heterosexual, are still widespread, and these norms encourage men to restrict self-protective health behaviors (Salgado et al., 2019). To counter masculine stereotypes, health promotion programs should focus on young men's susceptibility to HPV and work to shift normative behaviors around sexual health (Grace-Leitch & Shneyderman, 2016). Health messaging should target men on college campuses, especially in light of findings indicating that increased knowledge and perception of HPV susceptibility improved vaccine acceptability among young men. Future research should aim to understand how messaging impacts vaccine acceptance and adherence, including among males who do not identify with “stereotypical” masculine norms (Bonafide & Vanable, 2015; Lee et al., 2018).

### Limitations

This review is intended to guide practice for HCPs; however, there are several key limitations. The major limitation in this set of articles is that all but one ( $n = 14$ ) of the included studies (Fuller & Hinyard, 2017) gathered participants directly from post-secondary institutions. This

sampling method limits the findings in terms of understanding males who may not be attending conventional post-secondary institutions (i.e., college or university) and/or those from low socioeconomic backgrounds considered at high risk for contracting HPV, but who may not be afforded the same level of health promotion and prevention opportunities. The second limitation is that all the included studies were comprised exclusively of male samples. The absence of female perspectives creates a potentially segregated view of HPV, when in reality, HPV prevention needs to focus on genders equally, equitably, and relationally. Future work should focus on combined male and female strategies within college and university age ranges to decrease barriers. Such targeting is essential to creating a broader understanding and increasing the likelihood of a population effect on HPV vaccine adherence rates.

## Conclusion

Because the HPV vaccine recommendations were repeatedly updated for males over the last 10 years, evidence is still emerging on how best to increase vaccine adherence. With rates of HPV-related illnesses on the rise, strategies to mitigate this growing health concern must be established quickly in order to decrease related illness and deaths. The focus must be on health promotion and prevention approaches geared specifically to males. Norming male HPV vaccinations is key, and the work of that clearly resides with men and HCPs, parents, partners, and public health in redressing the gendered history that estranged men in the first place.

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